WESTERN IOWA TECH COMMUNITY COLLEGE
<u>**Course Syllabus**</u>

Term:
Course Number and Section: IND 141 ___
Course Title: Power Transmission
Semester Hours: 2.00
Meeting time/location:
Instructor:
Phone: 712.274.8733 Ext.
E-mail: @witcc.edu
Office Location:
Office Hours:

COURSE DESCRIPTION AND PREREQUISITES/COREQUISITES:

This course is designed to provide skills to work on and troubleshoot industrial drive systems including clutches, brakes and industrial bearings. A section on machinery lubrication is also included.

Prerequisite: None
Co-requisite: None

REQUIRED TEXTBOOKS/MATERIALS
1. Amatrol. *Basic, Intermediate, and Advanced LAP-Coastal Training CD's*, Current ed. Amatrol

COURSE OBJECTIVES

The course will provide information which should enable the student to:

1. Describe the operation of mechanical clutches and brakes
2. Determine the function of pneumatic clutches and brakes
3. Describe the operation and control of electrical clutches and brakes
4. Troubleshoot clutches and brakes
5. Describe key properties and lubricant functions
6. Identify various oil types
7. Describe methods of applying oils
8. Identify lubrication equipment and fittings
9. Perform lubricant handling and storage procedures
10. Describe lubricant applications and standards
11. Properly dispense machinery oils using lubrication equipment
12. Perform proper procedures with lubrication systems
13. Describe grease properties and functions
14. Identify grease types
15. Use manual, powered, and automated lubricants properly
16. Employ safe procedures to handle, store, and dispense grease
17. Recognize the importance and definition of a bearing
18. Differentiate between the types of bearings
19. Explain the forces that affect bearing wear and the life expectancy
20. Explain the function of protective housings
21. Differentiate between the types of loads
22. Explain the installation and care of plain and rolling-element bearings
23. Explain the different types of fittings for installation
24. Check and adjust operating clearances
25. Align bearings and equipment
26. Identify potential problems with bearings
27. Maintain schedule for monitoring bearing performance
28. Recognize procedures used to remove failed bearings
29. Identify possible reasons for bearing failure
30. Recognize and perform basic chain drive installation and maintenance procedures
31. Troubleshoot common chain drive system problems
32. Identify different belt drive systems and discuss drive ratios
33. Outline basic installation and maintenance procedures for belt drives

34. Troubleshoot common belt drive system problems
35. Describe the components and characteristics of operation for directly-coupled drive systems
36. Describe the components and characteristics of operation for jackshaft and auxiliary drive systems
37. Describe the effects of changing input and output speeds on auxiliary and jackshaft drive systems
38. Compute drive system efficiency
39. Describe the principles of operation for several types of overload protection devices
40. Describe troubleshooting strategies that can be applied to drive package problems
41. Describe the principles of enclosed gear drive operation and related terminology
42. Describe enclosed gear drive components
43. Identify different gear types and describe their operation
44. List typical applications for enclosed gear drives
45. Identify various types of adjustable speed enclosed drives
46. Describe the operation of adjustable speed gear drive components
47. Describe the application of an enclosed chain drive system
48. Identify its component parts, and explain how an enclosed chain drive operates
49. Describe how to properly install an enclosed chain drive
50. Describe proper enclosed drive system maintenance
51. Describe the proper procedures to use when troubleshooting an enclosed drive system
52. Understand the difference between types of gears associated with parallel and perpendicular shaft configurations
53. Identify critical attributes of gears
54. List interchange considerations of gears
55. Calculate dimensions of gears
56. Perform install procedures common to spur, helical, bevel, miter, and worm gearing
57. Recognize the most common types of wear on gears
58. Perform inspection procedures for spur, helical, bevel, miter, and worm gears
59. Recognize symptoms, causes of failure, and solutions for open-gear systems
60. List safety procedures used with open gearing
61. Complete shaft alignment tasks associated with drive performance
62. Properly install and troubleshoot fluid couplings
63. List safety precautions for shaft joining and coupling devices during inspection, maintenance and repairs
64. Install and align mechanical couplings
65. Describe procedures to maintain mechanical couplings
66. Identify shaft joining and coupling devices installation and maintenance terms
67. Describe operating principles of shaft joining and coupling devices
68. List conditions to consider when selecting connecting devices
69. Differentiate rigid, flexible and fluid couplings, and universal joints based on construction, purpose and application

CONTENT OUTLINE:

    I.   Clutches and Brakes
         a. Types and applications
         b. Troubleshooting
    II.   Machinery Lubrication
         a. Oil
         b. Equipment
         c. Grease
    III.   Industrial Bearings
         a. Applications
         b. Maintenance
         c. Troubleshooting
    IV.   Industrial Drives
         a. Chain Drives
         b. Belt Drives
         c. Drive packages
         d. Drive systems
         e. Gears & gear systems
         f. Shaft joining and coupling

COMPETENCIES:

At the conclusion of the course the student will be able to:

1. Recognize and analyze Clutch and Brake systems
2. Describe and recommend machinery lubrication requirements
3. Discuss Industrial bearing applications and maintenance
4. Recommend setup and troubleshoot Industrial drive systems

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